

ILLINOIS TOLLWAY UPDATE: A ROADMAP FOR USING INVEST ACROSS A MAJOR CAPITAL PROGRAM

In 2011, the Illinois Tollway board approved the Move Illinois capital program which would provide \$12 billion dollars in construction over 15 years to help to expand, rebuild, and widen the Illinois Tollway network to meet the needs of customers. One of the commitments made as part of the Illinois Tollway’s Move Illinois capital program was to make it the ‘cleanest and greenest’ program in Illinois Tollway history.

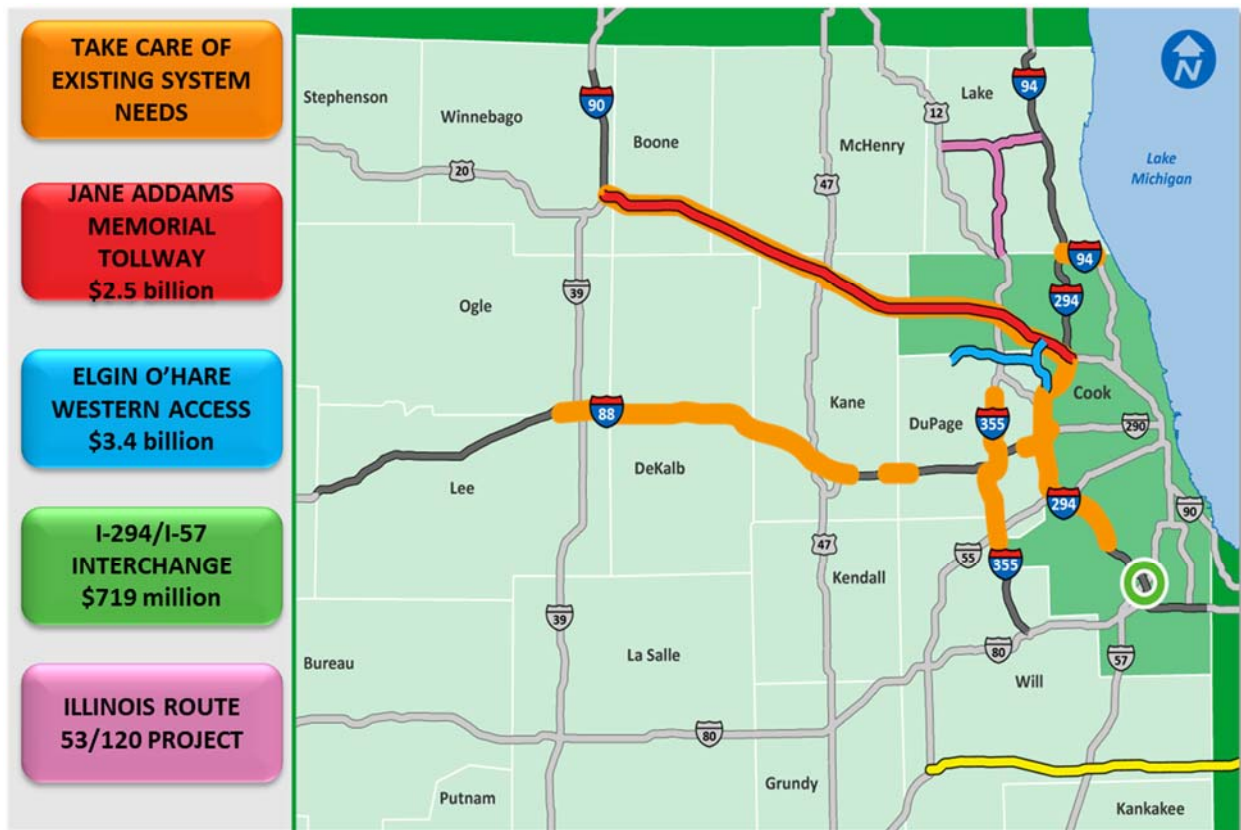


Figure 1. Map of the *Move Illinois* Capital Program

Implementing INVEST throughout an entire capital program has been a unique challenge that the Illinois Tollway met. The Illinois Tollway employed their inherent knowledge to conduct a program wide INVEST implementation using the many past experiences with other program wide tools that are utilized to aid the technical staff. The desire of this case study is to show the level of effort required to take the implementation of INVEST beyond a single project or two and carry that forward into an entire multi-year capital program. For the past three years, the Illinois Tollway has been implementing the INVEST tool to showcase the work of the current Move Illinois capital program with past capital programs.

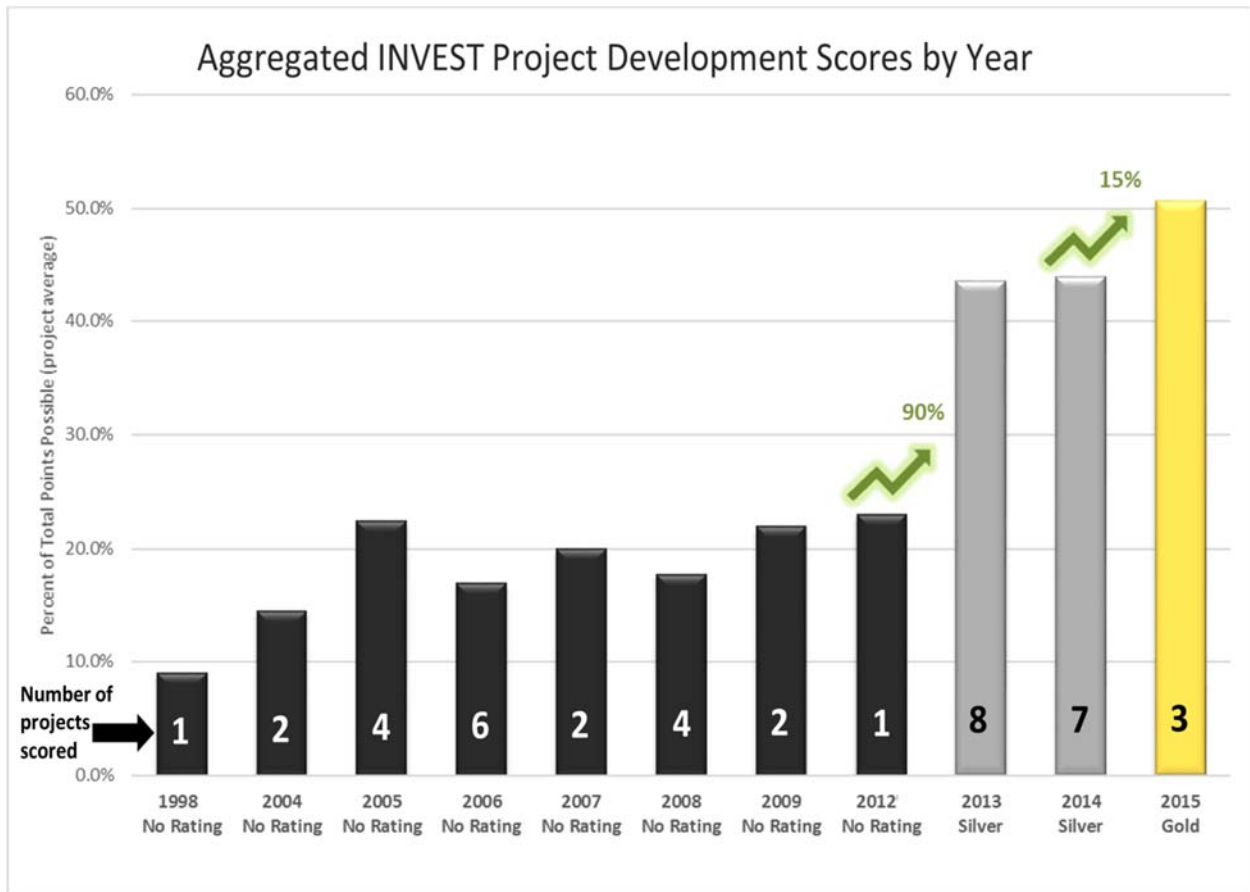


Figure 2. Aggregated INVEST Project Development Scores by Year

The FHWA’s INVEST program was adapted to meet the needs of the Illinois Tollway. INVEST allows the Illinois Tollway to assess a single construction contract as well as the rollup of several adjacent project scores to create one overall corridor score. While the Illinois Tollway’s pavements and structures are the primary assets used by the travelling public, the use of the INVEST tool has demonstrated the sustainability of these assets for which they are responsible to build, operate, update, and maintain.

Typical state DOT construction projects are completed over longer timeframes and broken into smaller segments than what the Move Illinois Program encapsulates. An example of one of the major projects that is being constructed from 2013-2016 is the \$2.5 billion reconstruction and widening of 62 miles of the I-90 corridor. The rural, western segment of the I-90 project was formerly two lanes in each direction for 37 miles, and has now been widened and reconstructed to three lanes in each direction in a two-year timeframe from 2013 to 2014. The remaining 25 miles of the highly urbanized eastern segment is on track to be widened and reconstructed from three lanes to four lanes each direction from 2014 to 2016. Two corridor scores and 24 project scores will be generated by the I-90 reconstruction project. I-90 is just one example of a project that has been evaluated with INVEST.

The implementation approach taken by the Illinois Tollway differs from other DOTs that have been highlighted in literature thus far. The Illinois Tollway is evaluating an entire capital program with several new, expanded, and re-constructed corridors. There are numerous complex layers of planning, design, and construction management efforts required to implement the INVEST program for an overall capital plan. Understanding how the corridors are set up will help explain how the Illinois Tollway has been

able to incorporate program-wide INVEST scoring. The processes and resources that the Illinois Tollway has dedicated should be considered when attempting to incorporate INVEST on a widespread scale for a state DOT.

Illinois Tollway projects typically start with an overall planning study. Once preliminary design starts, most large reconstruction or new alignment projects are grouped by corridor for which a Design Corridor Manager (DCM) consultant is retained to provide planning, design, and management services, and to oversee corridor-wide planning and design. These corridors are then broken into design sections, which are subdivided parts of the corridor designated by geography.



Figure 3. Project Implementation Hierarchy

Each design section is assigned a Design Section Engineer (DSE) consultant to provide planning, design, and management services for that unique section. The DSEs within a corridor report to the DCM, who is responsible for coordinating efforts throughout the corridor. Finally, design sections may be broken into different projects, or design packages, which address specific areas (e.g., the median or eastbound-only lanes) or disciplines (e.g., noise walls, bridge, or retaining walls).

Upon completion of design, the project moves forward to the construction phase. Similar to the DCM assignment, a Corridor Construction Manager (CCM) is hired to oversee the construction of the corridor as a whole. The corridor is broken into sections, usually in the same manner as design, and each construction section is managed by a Construction Manager (CM). The CMs provide oversight on the construction within their section, and report to the CCM if the construction section is a subset of a corridor.

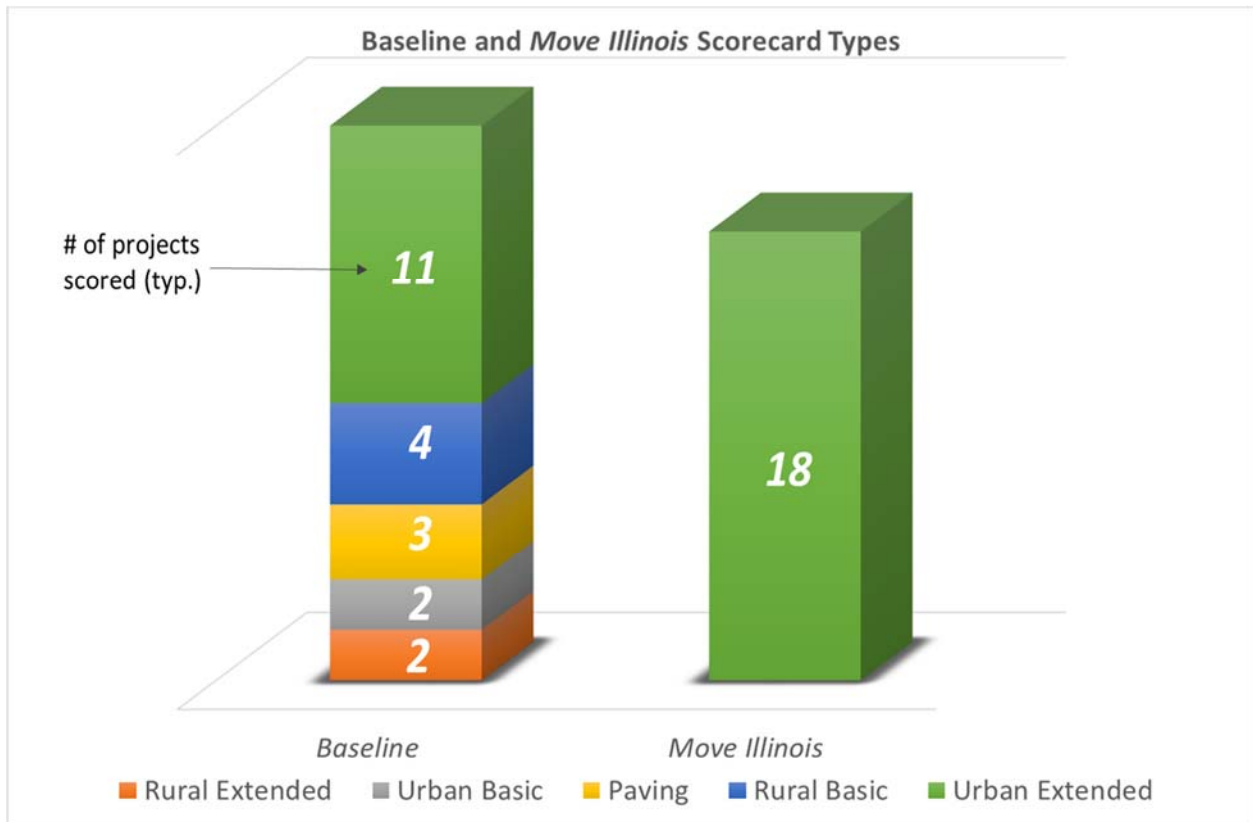


Figure 4. Number and Type of Scorecard Types

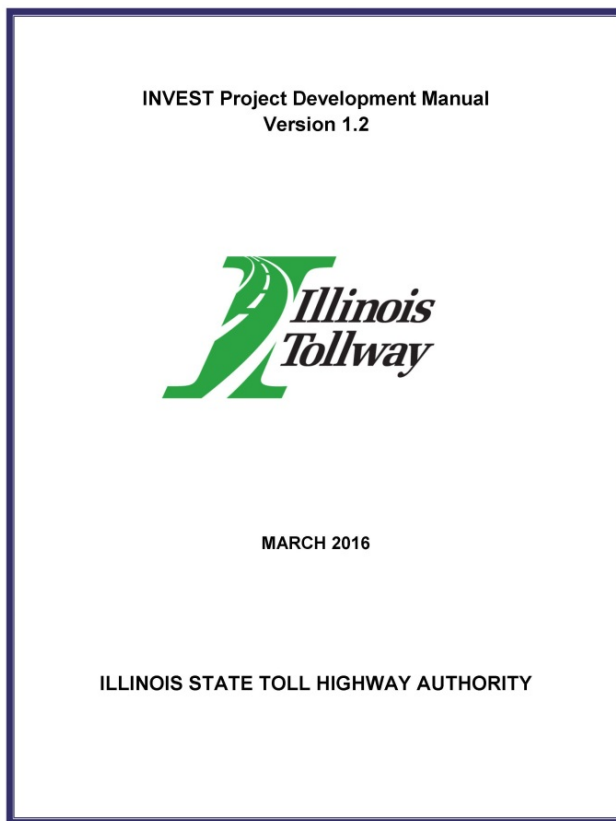
The Illinois Tollway has many complementary tools and procedures that allow for the consistent implementation of INVEST as part of everyday practices and procedures. Within a two year timeframe, the Illinois Tollway was able to evaluate FHWA’s INVEST program, develop additional criteria to score, develop supplements to existing criteria to facilitate scoring, score past projects, and score the ongoing work that was being performed. In year three, the INVEST team was able to report specific data that shows an improvement of the sustainable practices of the current capital program over past programs. By having a set of tools with modern software, adding INVEST data on a capital program scale simply becomes an aggregation of the data that the Illinois Tollway has already been collecting, rather than starting from the beginning of a project life cycle.

Tools that are in use:

- Web Based Project Management System
- Web Based Materials Management System
- Electronic Financial System
- Asset Management Database
- Geographic Information System
- Others

The Illinois Tollway is able to capture the details at each step of INVEST scoring by having a final review with the scorers. Doing the final review helps to keep the scores easy to defend and explain back to the stakeholders. An average estimate of the people involved to provide one INVEST scorecard from start to end is 15 to 20 people. This is a large number of people to be involved in one project by any estimate.

Communication through the manuals and e-mails about what is required is a necessity in order to get the results needed in an efficient and timely fashion.



http://www.illinoistollway.com/documents/10157/30214/01_INVEST_Manual_032016_FINAL

Project scoring has also been evaluated on the criteria level. The criteria analysis shows significant progress from that past to Move Illinois projects. Past projects scored strongly in PD-14 ITS. The Illinois Tollway excels at information dissemination, data archiving, ITS infrastructure backbone, incident management, dynamic message signs (DMS), and road weather information systems.

Illinois Tollway projects have significantly improved in PD-20 Recycled Materials. Past projects achieved 41% of the total possible points, and Move Illinois projects are scoring on average 81% of the total possible points. Projects are obtaining high scores in PD-20 by using Fractionated Reclaimed Asphalt Pavement (FRAP) at a higher percentage than Reclaimed Asphalt Pavement (RAP), by using RAP millings as new aggregates in new asphalt and concrete pavements, by recycling 100% of the original concrete pavements as recycled concrete aggregate for reuse as granular subbase, and by commonly reusing existing subbase granular material when roadway elevation is being lowered.

Illinois Tollway projects have improved in PD-26 Construction Equipment Emission Reduction. Past projects scored on average 54% of the total possible points, and Move Illinois projects are achieving 100% of the total possible points. Projects are earning high scores in PD-20 by implementing construction air quality diesel vehicle emission control and utilizing diesel retrofit devices for pollution control on non-road diesel vehicles.

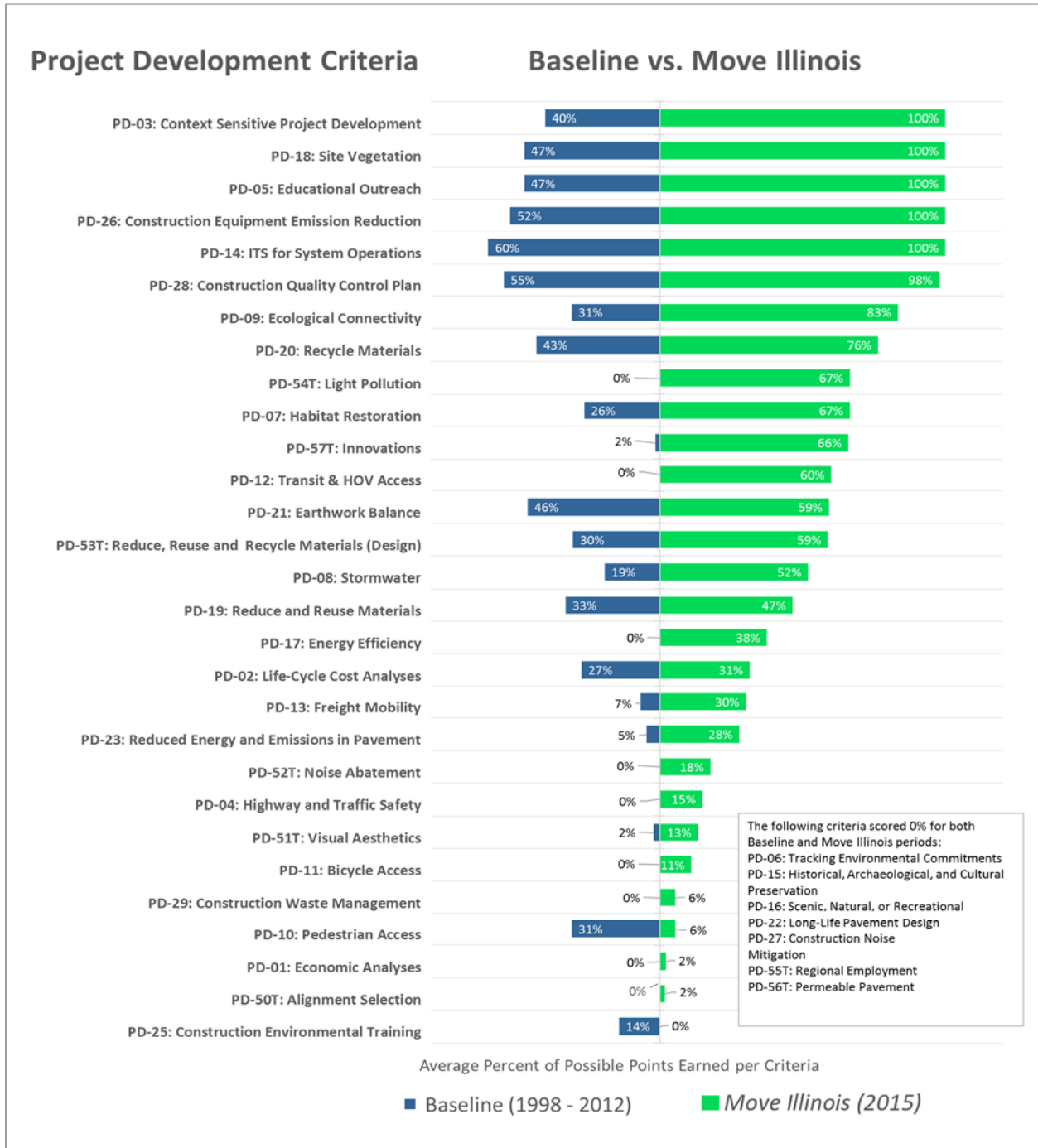


Figure 5. Comparison of Scorecards by Criterion

INVEST scores are examined annually by the INVEST team in conjunction with Illinois Tollway leadership staff. The annual assessment allows the Illinois Tollway to:

- Evaluate past and present sustainability performance
- Set a baseline against which future improvements can be measured
- Identify areas in which it excels
- Identify areas in need of improvement
- Measure progress in sustainability performance

- Identify and integrate sustainable practices
- Identify institutional or other barriers that may be preventing implementation of sustainable practices
- Report sustainability performance consistently to stakeholders
- Determine the need for new guidance documents, policies, or standards that would promote sustainability

Looking to the future, an agency looking to implement an INVEST scoring regime for a large scale program should be able to streamline the process by checking the scores in real time with updated software tools tied to the project management software. The advantage of tying the actual INVEST scorecards to project management software is to be able to track all of the transactions of the scoring back to each user. Know which user completed a parts of the scorecard helps to capture their comments, dates, time, and iterations thru the process. There is an opportunity to improve the scoring process by being able to query comments holistically.

Utilizing the INVEST program has been invaluable to the Illinois Tollway. This objective assessment tool has demonstrated (a) the Illinois Tollway has established a culture of efficient and sustainable management, and (b) fully incorporating the INVEST guidance into the Illinois Tollway's planning, project management, and operations is already resulting in greater efficiencies, cost savings, and improved stakeholder engagement. The Illinois Tollway does not only 'build green,' but also plans and operates green, while managing a safe, reliable, and responsible transportation system and crucial public asset.